

Attorney's Docket No. 64,600-091



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Chen-Kuei Chung  
Serial No.: 10/ 057,025  
Filed: Jan. 24, 2002  
For: Integrated Micro-Droplet Generator

Group Art Unit: 2853 ✓  
Examiner: Michael S. Brooke

Commissioner for Patents  
Alexandria, VA 22313

TRANSMITTAL OF APPEAL BRIEF (PATENT APPLICATION-37 CFR 192)

1. Transmitted herewith, in triplicate, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal Filed on Sept. 12, 2003.

NOTE: "The Appellant shall, within 2 months from the date of the notice of appeal under § 1.191(a) or within the time allowed for response to the action appealed from, if such time is later, file a brief in "triplicate", 37 C.F.R. 1.192(a) [emphasis added].

2. STATUS OF APPLICANT

This application is on behalf of:

X other than a small entity.  
— a small entity.

A verified statement:

— is attached.  
— was already filed.

3. FEE FOR FILING APPEAL BRIEF

Pursuant to 37 CFR 1.17(f), the fee for filing the Appeal Brief is:

— small entity	\$165.00
<u>X</u> other than a small entity	\$330.00

Appeal Brief fee due: \$ 330.00

Certificate of Mailing/Transmission (37 CFR 1.8(a))

I hereby certify that this correspondence is, on the date shown below, being:

Mailing

X deposited with the U.S. Postal Service  
with sufficient postage as Express Mail  
Label No. EL 993 945 230 US  
in an envelope addressed to Commissioner  
for Patents, Alexandria, VA 22313

Dated: Nov. 12, 2003

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4. EXTENSION OF TERM

NOTE: The time periods set forth in 37 CFR 1.192(a) are subject to the provision of ☐ 1.136 for patent applications. 37 CFR 1.191(d). See also Notice of November 5, 1985 (1060 O.G. 27).

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136 apply:

(complete (a) or (b), as applicable)

- (a) ☐ Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

	Extension (months)	Fee for other than <u>small entity</u>	Fee for <u>small entity</u>
<input type="checkbox"/>	one month	\$ 110.00	\$ 55.00
<input type="checkbox"/>	two months	\$ 420.00	\$210.00
<input type="checkbox"/>	three months	\$ 950.00	\$475.00
<input type="checkbox"/>	four months	\$1,480.00	\$740.00

Fee: \$ \_\_\_\_\_

If an additional extension of time is required, please consider this a petition therefor.

(check and complete the next item, if applicable)

- ☐ An extension for \_\_\_\_\_ months has already been secured, and the fee paid therefor of \$ \_\_\_\_\_ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request: \$ \_\_\_\_\_

or

- (b) ☐ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE

The total fee due is:

Appeal Brief Fee: \$ 330.00  
Extension fee (if any) \$ \_\_\_\_\_

TOTAL FEE DUE: \$ 330.00

6. FEE PAYMENT

X Attached is a Credit Card Payment Form for the sum of \$ 330.00  
X Credit Card Payment Form in the sum of \$ 330.00.  
A duplicate copy of this transmittal is attached.

7. FEE DEFICIENCY

NOTE: If there is a fee deficiency and there is no authorization to charge an account, additional fees are necessary to cover the additional time consumed in making up the original deficiency. If the maximum six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in returning the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to charge the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, 1065 O.G. 31-33.

X If any additional extension and/or fee is required, this is a request therefor  
to charge Deposit Account No. 50-0484

And/Or

X If any additional fee for claims is required, please charge Deposit Account  
No. 50-0484



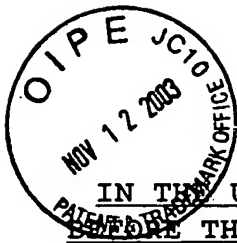
Signature of Attorney

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

#101 Appeal  
Brief  
Answered  
12/1/03

Applicant: Chen-Kuei Chung

Group Art Unit: 2853

Serial No.: 10/057,025

Examiner: Michael S. Brooke

Filed: January 24, 2002

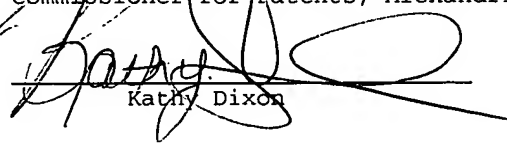
For: Integrated Micro-Droplet Generator

Attorney Docket No.: 64,600-091

**EXPRESS MAIL CERTIFICATE**

"Express Mail" label number EL 993 945 230 US  
Date of Deposit November 12, 2003

I hereby certify that this paper in triplicate and a credit card payment form in the amount of \$330.00 (required filing fee) are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR §1.10 on the date indicated above and is addressed to: Mail Stop: Appeal, Commissioner for Patents, Alexandria, VA 22313-1450.

  
Kathy Dixon

**APPEAL BRIEF**

Mail Stop: Appeal  
Commissioner for Patents  
Alexandria, VA 22313-1450

Sir:

Appellants appeal in the captioned application from the Examiner's final rejection dated June 12, 2003 of claims 11-20 under 35 USC §103(a) as being unpatentable over Ramaswami et al '471, Abe et al '562, Figueredo et al '674, Taub et al '442 and Hawkins et al '245

It is urged that the rejection be reversed and that all the claims be allowed.

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(1) REAL PARTY IN INTEREST

The real party in interest in the present appeal is the recorded Assignee of Industrial Technology Research Institute.

(2) RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences that are known to the Appellants, the Appellants' legal representative, or the assignee.

(3) STATUS OF CLAIMS

Claims 11-20 are pending in the application.

Claims 11-20 stand rejected. No claims stand allowed.

(4) STATUS OF AMENDMENTS

A Request For Reconsideration was filed on or about August 12, 2003.

An Advisory Action was received from the Examiner dated October 7, 2003 rejecting all claims.

A Notice of Appeal was filed on or about September 12, 2003.

(5) SUMMARY OF THE INVENTION

The invention relates to a thermal bubble type inkjet head that is equipped with a symmetrical, off-shooter heater.

(Specification, page 1, paragraph 001)

The invention is further directed to a thermal bubble inkjet head that is equipped with symmetrical heaters which includes a silicon substrate that has a top surface and a bottom surface; a first and a second insulating material layer of at least 1000Å thick on the top and bottom surfaces; a funnel-shaped manifold formed in the second insulating material layer and the silicon substrate; a symmetrical ring-shaped heater formed on the first insulating material layer on the top surface; an interconnect formed of a conductive metal in electrical communication with the ring-shaped heater; a third insulating material layer on top of the ring-shaped heater and the first insulating material layer; a first photoresist layer of at least 2000Å thick on top of the third insulating material layer; an ink chamber formed in the first photoresist layer in fluid communication with the funnel-shaped manifold; a metal seed layer on top of the first photoresist layer and an inkjet orifice formed in the metal seed layer; and a Ni layer on top of the metal seed layer with an aperture formed therein in fluid communication with the inkjet orifice.

(Specification, pages 6 and 7, paragraph 0014)

In the thermal bubble inkjet head that is equipped with a symmetrical heater, the first photoresist layer preferably has a thickness of at least 5000Å, the inkjet orifice is formed in close proximity to the ring-shaped heater; the first and second insulating material layers may be a SiO<sub>2</sub> layer or a Si<sub>3</sub>N<sub>4</sub> layer. The ring-shaped heater may be formed of TaAl, the metal seed layer may be deposited of Cr or Ni. The ring-shaped heater may be positioned in the ink chamber. The inkjet orifice may be formed in the ink chamber opposite to the ring-shaped heater. The inkjet head may be a monolithic head.

(Specification, page 7, paragraph 0015)

(6) ISSUE

Is the rejection of claims 11-20 under 35 USC §103(a) as being unpatentable over Ramaswami et al , Abe et al, Figueredo et al, Taub et al and Hawkins et al proper when such references do not teach or suggest the specifically claimed limitations in the present application?

(7) GROUPING OF CLAIMS

The rejection of claims 11-20 are contested as a group. The claims within this group stand or fall together.

(8) ARGUMENTS

Claims 11-20 are rejected under 35 USC §103(a) as being unpatentable over Ramaswami et al '471 in view of Abe et al '562, Figueredo et al '674, Taub et al '442 and Hawkins et al '245.

It is contended that Ramaswami et al substantially teaches the present invention except a ring-shaped heater, a funnel shaped manifold, a metal seed layer, a nickel layer, and a seed layer formed of Ni or Cr. It is further contended that Abe et al teaches a ring-shaped heater, Figueredo et al teaches a center feed type ink manifold, Taub et al teaches a funnel-shaped ink manifold, and Hawkins et al teaches Ni or Cr seed layer and a plate layer of nickel.

The rejection of claims 11-20 under 35 USC §103(a) based on Ramaswami et al, Abe et al, Figueredo et al, Taub et al and Hawkins et al is improper and must be reversed.

The Appellants respectfully submit that the basic structure, as recited in independent claim 11 of the present invention, and shown in Figure 1N, is not taught or disclosed by Ramaswami et al, neither by Abe et al, Figueredo et al, Taub et al and Hawkins et al. There are at least two main features taught,



disclosed and claimed in independent claim 11 not disclosed by either one of the five references. For instance:

"a funnel-shaped manifold formed in said silicon substrate;

...

a first photoresist layer of at least 2000Å thick on top of said second insulating material layer;

an ink chamber formed in said first photoresist layer in fluid communication with said funnel-shaped manifold".

The Appellants respectfully submit that the primary reference of Ramaswami et al, as shown in Figure 4, does not teach a funnel-shaped manifold formed in a silicon substrate. The silicon substrate layer 202 of Ramaswami et al has nothing formed in it. Instead, as shown in col. 35, the firing chamber 264 (in a funnel-shape) is formed in barrier layer 260, which is formed of high-dielectric organic compounds of polymers. (Lines 6-14 and 34-42). The Applicants further submit that the funnel-shaped manifold formed in the silicon substrate of the present invention is not taught or disclosed by Figueredo et al. Figueredo et al discloses, at col. 3, lines 59-62, and in Figure 1A, ink channels 29 or 129 (of funnel-shape) formed in an ink barrier layer 12 that is a dry film heat and pressure laminated to the thin film substrate 11 and

U.S.S.N. 10/057,025

photo defined. The ink barrier layer 12 is therefore a photoresist material and not a silicon substrate.

The Appellants further submit that Ramaswami et al does not teach an ink chamber formed in a photoresist layer and in fluid communication with the funnel-shaped manifold. As a matter of fact, Ramaswami et al teaches only a firing chamber 264 (Figure 4) for ejecting ink through orifice 108 that is heated by resistor 86. Ramaswami et al therefore teaches only a single firing chamber, and not an ink chamber and a funnel-shaped manifold for feeding ink into the ink chamber as taught by the present invention. The Appellants further submit that the ink chamber plus the funnel-shaped manifold structure of the present invention is not taught or disclosed by Abe et al, Figueredo et al, Taub et al and Hawkins et al.

The rejection of claims 11-20 under 35 USC §103(a) based on Ramaswami et al, Abe et al, Figueredo et al, Taub et al and Hawkins et al is improper and must be reversed.

CLOSING

In summary, the Appellants have shown that their claimed invention is fully supported by a body of evidence of non-obviousness. It is therefore respectfully submitted that such evidence of non-obviousness overcomes any showing of obviousness presented by the Examiner. The Appellants therefore submit that the final rejection of their claims 11-20 is improper under 35 USC §103(a).

The reversal of the final rejection is respectfully solicited from the Board.

Respectfully submitted,

Tung & Associates

By: 

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Randy W. Tung  
Registration No. 31,311  
Telephone: (248) 540-4040

RWT\kd

CLAIM APPENDIX

1. - 10. (Cancelled)

11. (Previously Presented) A thermal bubble inkjet head having a symmetrical off-shooter heater comprising:

a silicon substrate having a top surface and a bottom surface;

a first insulating material layer of at least 1000Å thick on said top surface;

a funnel-shaped manifold formed in said silicon substrate;

a symmetrical ring-shaped heater formed on said first insulating material layer on said top surface;

an interconnect formed of a conductive metal in electrical communication with said ring-shaped heater;

a second insulating material layer on top of said ring-shaped heater and said first insulating material layer;

a first photoresist layer of at least 2000Å thick on top of said second insulating material layer;

an ink chamber formed in said first photoresist layer in fluid communication with said funnel-shaped manifold;

a metal seed layer on said first photoresist layer and an inkjet orifice formed in said metal seed layer; and

a Ni layer on top of said metal seed layer with an aperture formed therein in fluid communication with said inkjet orifice.

12. (Original) A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said first photoresist layer preferably has a thickness of at least 5000Å.

13. (Original) A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said inkjet orifice is formed in close proximity to said symmetrical ring-shaped heater.

14. (Previously Presented) A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said first insulating material layer is a SiO<sub>2</sub> layer or a Si<sub>3</sub>N<sub>4</sub> layer.

15. (Original) A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said symmetrical ring-shaped heater is formed of TaAl.

16. (Original) A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said metal seed layer is deposited of Cr or Ni.

17. (Original) A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said ring-shaped heater is positioned juxtaposed to said inkjet orifice.

18. (Original) A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said ring-shaped heater is positioned in said ink chamber.

19. (Original) A thermal bubble inkjet head having a symmetrical heater according to claim 18, wherein said inkjet orifice is formed in said ink chamber opposite to said ring-shaped heater.

20. (Original) A thermal bubble inkjet head having a symmetrical heater according to claim 11, wherein said inkjet head is a monolithic head.